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Asterolasia beckersii (Rutaceae), a new species from the Northern Tablelands, New South Wales

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Abstract

Asterolasia beckersii Orme & Duretto (Rutaceae) is newly described. The species is restricted to the Nundle area (Tamworth district) on the Northern Tablelands of New South Wales. The species is related to *A. correifolia* (A.Juss.) Benth. and *A. hexapetala* (A.Juss.) Druce and can be distinguished from these by leaf, inflorescence and floral characters. The ecology and conservation status of *A. beckersii* are discussed and a key to *Asterolasia* for eastern Australia is provided.

Introduction

In 1995 Doug Beckers, a New South Wales (NSW) National Parks and Wildlife officer, collected a specimen of *Asterolasia* (Rutaceae) from the Dungowan Dam area, near the town of Nundle (Tamworth district) on the Northern Tablelands of NSW (Fig. 1). The specimen was of an apparently undescribed species and has been given the informal name of *Asterolasia* sp. Dungowan Creek (Beckers s.n. 25 Oct 1995), as used in the *Flora of New South Wales* (Harden & Mole 2002), PlantNET (2016) and the Australian Plant Census (APC 2016). However, this taxon was not included in the recent treatment of the *Asterolasia* for the *Flora of Australia* (Wilson 2013).

Asterolasia sp. Dungowan Creek (Beckers s.n. 25 Oct 1995) is similar to *A. correifolia* (A.Juss.) Benth. (coastal and tableland areas of NSW, south-eastern Qld) and *A. hexapetala* (A.Juss.) Druce (Warrumbungle Range, North West Slopes, NSW) and can be distinguished from these taxa based on leaf, inflorescence and floral characters (see diagnosis below). *Asterolasia correifolia* and *A. hexapetala* are closely related and Wilson (2013) indicated that the division between them may be artificial. Geographically, *A.* sp. Dungowan Creek (Beckers s.n. 25 Oct 1995) is distributed between *A. correifolia* and *A. hexapetala* and the three species are allopatric (Fig. 1).

Here we formally describe *Asterolasia* sp. Dungowan Creek (Beckers s.n. 25 Oct 1995) as *Asterolasia beckersii* Orme & Duretto.

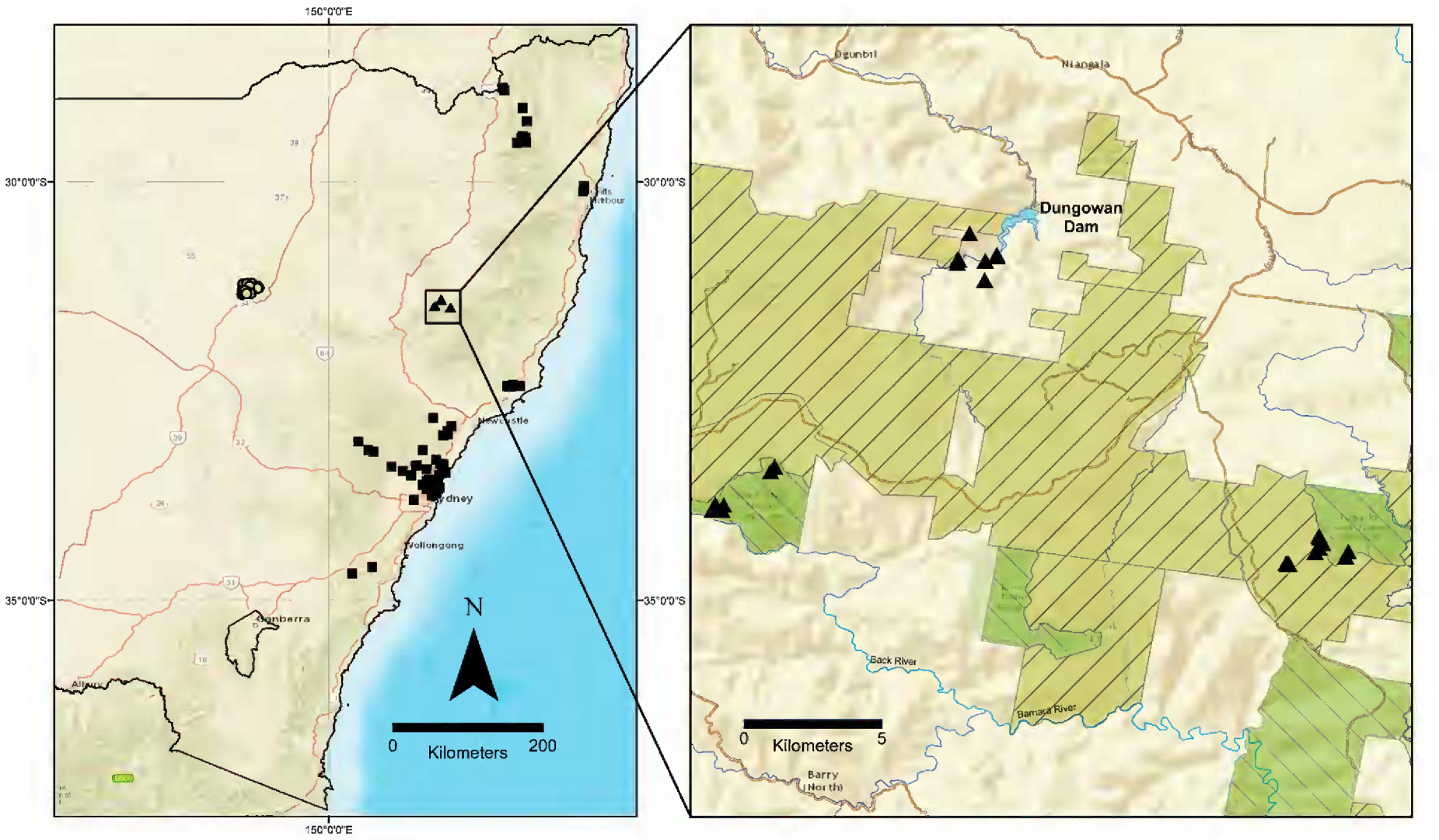

Fig. 1. Map showing the distribution of *Asterolasia beckersii* (triangles), *A. correifolia* (squares) and *A. hexapetala* (circles). State Forest (forward hatching), National Parks and Wildlife Service estate (backward hatching).

Asterolasia beckersii Orme & Duretto, **sp. nov.**

Diagnosis: Differs from *Asterolasia correifolia* by having leaves hirsute on the adaxial surface (versus hirsute on the adaxial surface of the young leaves only, hairs tardily deciduous), and from *A. hexapetala* by having leaves oblanceolate to obovate or elliptic (versus lanceolate), smaller petals (6–7 mm long versus 8–10 mm long), and shorter pedicels (5–8(–10) mm long versus (5–)10–20 mm long).

Type (precise locality details withheld)**:** Australia: New South Wales: Northern Tablelands: Dungowan Dam, on site of old property "Paradise", *R. Johnstone 1192, G. Bartlett, N. Foster & G.* Lampert, 22 Oct 2003 (holo: NSW610253; iso: BRI, CANB *n.v.*, NE).

Asterolasia sp. Dungowan Creek (Beckers s.n. 25 Oct 1995), Harden & Mole, *Fl. New South Wales* 2 (revised edn): 313 (2002).

Erect shrub to 3 m tall. *Stems* with a dense stellate indumentum, stellae rusty to orange-brown in colour. *Leaves* mostly shortly petiolate; petiole (0.5–)1.5–5.5(–9.5) mm long; lamina oblanceolate to obovate or elliptic, (6–)15–45(–55) mm long, (4–)6–16(–22) mm wide, apex obtuse or rounded, base cuneate to obtuse, margins entire, undulate; abaxial surface with densely overlapping hyaline stellate hairs, stellae 0.35–0.75 mm diameter, with larger rusty coloured rays; adaxial surface with a short indumentum of hyaline stellate hairs, stellae 13–25 per mm^2, 0.2–0.3 mm diameter. *Inflorescence* a terminal (occasionally axillary) umbel of 1–3 flowers, usually with one or two flowers opening at one time, occasionally with 3 flowers open at once; pedicel 5–8(–10) mm long in flower, lengthening slightly as fruit develops. *Calyx* inconspicuous. *Petals* 6–7 mm long, cream to white; abaxial surface with hyaline stellate hairs, rays free; adaxial surface glabrous. *Stamens*: filaments glabrous; anthers 1.2–2.0 mm long. *Carpels* 5; ovary densely hairy with coarse stellate hairs; style glabrous. *Cocci* with stellate hairs in 2 layers, a lower obscured layer of smaller hairs with an upper layer of larger rusty coloured hairs; cocci beaked to 2.5–3.5 mm long. *Seed* 2.0–2.5 mm long, dark grey-brown, glabrous, reniform. **Fig. 2**.

Selected specimens seen (13 specimens examined; precise locality details withheld): AUSTRALIA: New South Wales: Northern Tablelands: Dungowan Dam, *D.J. Beckers s.n.*, 30 Jan 1992 (NSW 413432 & NSW 413434); Dungowan Creek, *D.J. Beckers, T. Prior, N. Foster s.n.*, 25 Oct 1995 (BRI *n.v.*, CANB, NSW 388997, PERTH *n.v.*); Dungowan Creek, *R.L. Johnstone 3037 & G. Errington*, 14 Dec 2011 (NE *n.v.*, NSW); Tuggolo Creek Nature Reserve, *L.M. Copeland 4237*, 19 Apr 2007 (CANB *n.v.*, NSW); Back River Nature Reserve, c. 15 km E of Nundle, *L.M. Copeland 4072*, 25 May 2006 (BRI, CANB, NSW).

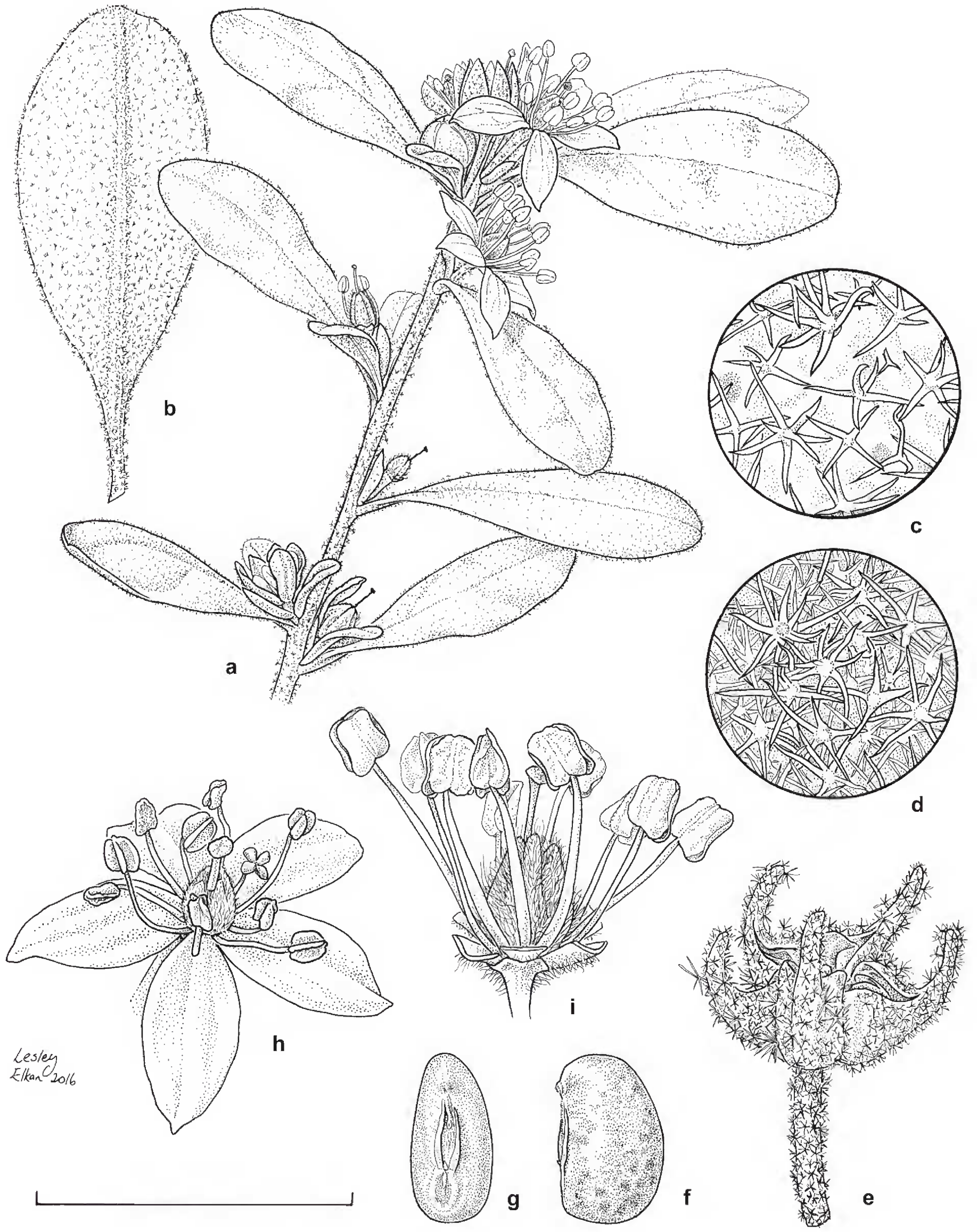

Fig. 2. *Asterolasia beckersii*. **a**, habit; **b**, leaf, abaxial surface; **c**, detail of hairs on adaxial surface of leaf; **d**, detail of hairs on abaxial surface of leaf; **e**, cocci; **f**, seed, lateral view; **g**, seed, dorsal view; **h**, flower; **i** flower, stamens and ovary. Vouchers: a, c, d, h [photograph of living plant, A. Orme], i (R. Johnstone 1192, NSW610253, holotype); b, e, f, g (R. Johnstone 3037, NSW888783). Scale bars: a, b = 2.5 cm; c, d = 0.1 cm; e, h = 1.0 cm; f, g = 0.4 cm; i = 0.8 cm.

Distribution: Known from three populations that are approximately 10 to 20 km apart in the Nundle to Nowendoc area, south-east of Tamworth: 1) Dungowan Creek above Dungowan Dam; 2) Tuggolo Nature Reserve and Tuggolo State Forest; and 3) Back River Nature Reserve.

Habitat: Occurs in riparian *Casuarina cunninghamiana - Eucalyptus viminalis* woodland communities, or on steep slopes in *E. nobilis - E. obliqua* woodland or forest.

Conservation status: In 2004, this species was determined to be Endangered under Schedule 1 of the New South Wales *Threatened Species Conservation Act* 1995; it is not listed under Federal legislation. Plants are known to occur in Tuggolo Creek and Back River Nature Reserves, Tuggolo State Forest and the area above Dungowan Dam which is managed by local government and under some protection as a water catchment area (Fig. 1). After visits to each of the three sites, the extent of each population was found to be small, and where population size data was recorded with herbarium specimens, it was noted to be between one and 20 individuals.

Etymology: The epithet honours Doug Beckers (NSW National Parks and Wildlife officer) for discovering the species.

Key to the species and subspecies of *Asterolasia* found in eastern Australia (SA, Vic., NSW, Qld)

Note: Of the taxa found in eastern Australia only *A. asteriscophora* subsp. *albiflora* (E Vic.; couplet 6), *A. muricata* (SA; couplet 1), *A. phebalioides* (SA, W Vic.; couplet 13) do not occur in NSW. All Western Australian species have 1–4 carpels and a key to these species is provided by Wilson (2013). The couplets leading to the subspecies of *A. trymalioides* are based on the key of McDougall et al. (2016).

1 Carpels 2, stellate-tomentose (SA) ..... ***A. muricata***

1: Carpels 5, glabrous or stellate-tomentose (SA; Vic.; NSW; Qld) **2**

2 Flowers white to pale yellow, pedicellate, in 1–9-flowered clusters; leaves mostly >3 cm long, 5–30 mm wide, flat **3**

2: Flowers usually bright yellow, sessile or pedicellate, solitary or in few-flowered clusters; leaves usually <3 cm long, 2–10 mm wide, with margins slightly recurved to revolute **7**

3 Leaf apex acuminate; petals 8–14 mm long ..... ***A. elegans***

3: Leaf apex obtuse to acute; petals 5–10 mm long **4**

4 Leaves with adaxial surface glabrous at maturity, abaxial surface stellate-tomentose ..... ***A. correifolia***

4: Leaves with both surfaces stellate-tomentose at maturity **5**

5 Petals 8–10 mm long*; pedicels (5–)10–20(–30 with fruit) mm long; branchlets rusty-tomentose (NSW: NWS - Warrumbungle area) ..... ***A. hexapetala***

5: Petals 4–7 mm long; pedicels 2–7(–15 in *A. asteriscophora*, Vic.) mm long; branchlets fawnish tomentose (NSW: NT - Nundle area, Tamworth district; Vic.) **6**

6 Leaves (6–)15–45(–55); inflorescence an umbel of 1–3 flowers, usually only 1 opening at a time; petals 6–7 mm long (NSW: NT) ..... ***A. beckersii***

6: Leaves 4–16 mm long; inflorescence an umbel of 3–5 flowers, usually most opening at same time; petals 4–6 mm long (E Vic.: Emerald area) ..... ***A. asteriscophora* subsp. *albiflora***

7 Leaves narrow-oblong to oblong-cuneate (length:breadth ratio of 5–8:1), adaxial surface muricate, margins recurved ..... ***A. rivularis***

7: Leaves elliptic to spathulate, ± circular or obcordate to obovate (length: breadth ratio of 1–3:1), adaxial surface glabrous or stellate hairy, margins recurved or flat **8**

8 Flowers 1-8, pedicels 2–20 mm long at flowering; cocci beaked (Qld; NSW: NT, CT, ST; Vic.) **9**

8: Flowers solitary, sessile or subsessile; cocci rounded or beaked (NSW: SC, CT, ST) **11**

9 Leaves ± lanceolate to elliptic or oblanceolate, sometimes narrow-oblong, 4–35 mm long, adaxial surface sparsely or densely stellate; petiole terete, 2–7mm long, not appressed to the stem; base of lamina often v-shaped on upper surface giving the appearance of an extended petiole (Qld; E NSW; Vic.) ..... ***A. asteriscophora* subsp. *asteriscophora***

9: Leaves obcordate to obdeltate, 7–20 mm long, adaxial surface densely stellate, shortly petiolate (<2 mm) or sessile; petiole when present somewhat thickened and flat, often appressed to the stem (NSW: NT, CT) **10**

10 Leaf margins not recurved (NSW: NT, Mt Kaputar NP; CT, Mt Carobolas)..... ..... ***A. rupestris* subsp. *rupestris***

10: Leaf margins strongly recurved (NSW: NT, Armidale area) ..... ***A. rupestris* subsp. *recurva***

11 Ovary glabrous; leaves 5–18 mm long (NSW: CT, Hartley area) ..... ***A. buxifolia***

11: Ovary stellate-tomentose; leaves 3–10 mm long (SA; Vic.; NSW: S from Penrose) **12**

12 Leaves broad-obovate or cuneate-obcordate, with margins not or slightly recurved, adaxial surface dull, glabrous to densely stellate hairy; cocci beaked **13**

12: Leaves elliptic to circular, with margins recurved/revolute, adaxial surface glossy, glabrous or sparsely stellate hairy or hispidulous; cocci not beaked; south from the A.C.T and the Budawang Ra. (E Vic.; NSW: SC, ST) **14**

13 Leaves scattered along branches, distinctly discolorous with the abaxial surface lighter and with a denser indumentum, broad obovate; cocci hirsute (NSW: CT) ..... ***A. buckinghamii***

13: Leaves congested at the ends of branches, not discolorous, densely stellate tomentose, cuneate-obcordate; cocci glabrous (SA; W Vic.) ..... ***A. phebalioides***

14 Leaves, stems and especially, new growth, densely covered in stalked, stellate hairs with stalks up to 1.7 mm long and stellae up to 1.5 mm diam., the stalks persisting as sparse to moderately dense tubercles or short bristles (ACT; NSW: ST, Tinderry Range; Vic.: Bowen Range) ..... ***A. trymalioides* subsp. *villosa***

14: Leaves and stems variously hairy when young but stalks of stellate hairs, when retained, mostly < 0.5 mm long (very rarely to 0.9 mm) and stellae 0.3–0.9 mm diam., adaxial surface of leaves soon glabrous, but with scattered tubercles (NSW & Vic.: Australian Alps; NSW: also Morton NP) **15**

15 Erect shrub to 2 m tall; petals bright yellow, typically 7.5–10 mm long; recurved leaf margins usually covering up to 10% of the abaxial surface; style mostly >3 mm long; stigma to 0.8 mm diam. when fully expanded (NSW: Morton NP) .....***A. trymalioides* subsp. *areniticola***

15: Prostrate or low shrub; petals dull yellow, typically 5–6 mm long; recurved leaf margins covering c. 20% or more of the abaxial surface; style mostly <3 mm long; stigma > 1.3 mm diam. (NSW & Vic.: Australian Alps) ..... ***A. trymalioides* subsp. *trymalioides***

* Note: previously published lengths for the petals of *A. hexapetala* (7–9 mm long by Harden and Mole (2002) and c. 8 mm long by Wilson (2013)) have proven to be imprecise following careful examination of material housed at NSW.

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